SUBJECT INDEX

A

ABA
  See Abscisic acid
Aberration, 72
Abiotic factors
  plant/pest relationships and, 99
Abnormality, 72
Abscisic acid (ABA)
  protein synthesis and, 257
Abutilon striatum var. *thompsonii*, 72
Acetate-mevalonate pathway
  hydroxymethylglutaryl coenzyme A reductase and, 281
ACMV
  See African cassava mosaic virus
Acremonium, 40-46
Acremonium chrysogenum, 44
Acremonium coenophialum
  seed disease and, 451
Acremonium lolii, 45
Acremonium sect. *albolanosum*, 44-45
Acremonium starrii, 45
Acremonium typhinum, 45
Active oxygen (AO)
  antimicrobial activities of, 312-13
  cell wall strengthening and, 314-15
  hypersensitive cell death and, 313-14
  phytoalexin elicitation and, 315
  plant pathogenesis and, 299-316
  production during plant/pathogen interactions, 305-9
  sources of, 309-12
Active oxygen (AO) species, 300-2
  detection of, 303-5
Advanced Genetic Sciences, 17
Aerial photography
  in plant pathology, 497-99
Aerial radiometry
  in plant pathology, 499-500
Aeromonas
  survival on dry leaves, 150
Aeschynomeme virginica, 10
Aflatoxin, 53-54
AFLP
  See Amplified fragment length polymorphism
AFRCWHEAT2, 124
African cassava mosaic virus (ACMV)
  incidence of, 554-56
Agaricus bisporus
  somatic recombination in, 375
Aggressiveness, 71, 87
Agrobacterium tumefaciens
  extracellular polysaccharide of plant pathogenesis and, 187-90
  mechanism of tumor induction by, 15
Agronomic vulnerability, 95
Agropyron
  barley yellow dwarf disease and, 431-32
Ajellomyces capsulatus, 49
Alfalfa
  bacterial wilt of, 178-79
Alfalfa mosaic virus (AlMV)
  pathogen-derived resistance and, 325-38
ALFALFA.PRO, 492
Allan, Robert E., 429-39
AlMV
  See Alfalfa mosaic virus
Alternaria, 55-56, 60
Alternaria alternata, 56
  seed disease and, 448
Alternaria brassicicola, 455
Alternaria dauci
  seed disease and, 451
Alternaria gaisen, 56
American Phytopathological Society (APS), 28, 31, 70
Amplified fragment length polymorphism (AFLP)
  plant disease resistance genes and, 395
Amylovoran, 180-82
Analysis of variance (ANOVA)
  plant disease incidence and, 553-54
Anderson, James B., 369-88
Annotated List of Seedborne Diseases, 457
ANOVA
  See Analysis of variance
Anthesis
  disease management during, 448
Anthrax, 4
AO
  See Active oxygen
Appel, D. N., 103-15
Apple
  fire blight of, 179-80
APS
  See American Phytopathological Society
Arabidopsis
  disease resistance genes cloned from, 410-11
Arabis mosaic nepovirus
  seed transmission of, 455
  vector of, 224
Arceuthobium, 9
ARIMA
  See Autoregressive, integrated, moving-average model
Armillaria gallica
  territorial clones of, 375-81
Arny, Deane, 16
Artichoke Italian latent virus
  vector of, 230
Ascocalyx, 55
Ascocarp
  developmental morphology of, 25-26
Ascomycetes
  filamentous
    systematics of, 37-61
  morphology of, 25-26
  stem-infecting
    dispersive clones of, 381-87
Ascorbate
  as antioxidant in plant cells, 303
Ascosphaera, 50
Ascosphaera apis, 49
Aspergillioides, 51
Aspergillus, 28, 50-54
  seed disease and, 451
Aspergillus flavus, 53
Aspergillus nidulans, 59
  intergeneric host specialization and, 478-79
Aspergillus niger, 54
Aspergillus nomius, 53-54
Aspergillus oryzae, 53
Aspergillus parasiticus, 53
Aspergillus sojae, 53
Aspergillus tubingensis, 54
Attack, 82-83
  tolerance to, 92
Autoregressive, integrated, moving-average model (ARIMA)
  plant disease incidence and, 556-57
Avirulence, 71, 96-97
Avoidance, 145, 147

B

Bacteria
  endophytic, 146-47
  epiphytic, 146-47
    role in frost injury, 16-18, 160
  ice-nucleating, 17-18, 160
  phytopathogenic
    extracellular polysaccharides produced by, 176-77
  plant disease and, 4-5
Bacterial pathogens
  foliar, 145-65
    adaptations to avoid environmental stresses, 151-56
    adaptations to tolerate environmental stresses, 148-51
    epidemiology of, 160-63
    location on leaf surfaces, 147-48
    survival strategies of, 156-60
  phytoalexins and, 284-85
Bacterial polysaccharides
  plant pathogenesis and, 173-91
Bakanae disease, 10
Baker, C. Jacyn, 299-316
Balansia, 41
Banana
  Sigatoka leaf disease of, 56
Barley
  disease resistance genes in
    markers linked to, 397
  powdery mildew resistance in
    quantitative trait loci for, 406
  quantitative disease resistance in
    quantitative trait loci determining, 399
Barley stripe mosaic virus
  double diffusion assay for, 453
Barley yellow dwarf disease, 431-32
Basidiomycetes
  root-infecting
    territorial clones of, 375-81
Bdellovibrio bacteriovorus, 8-9
Bean
  brown spot disease of, 17, 160-61
  leaf-spot disease of, 183
  quantitative disease resistance in
    quantitative trait loci determining, 399
Bean rust, 95
Beattie, Gwyn A., 145-65
Beckman Instruments, 7
Beer's law, 123
Beijerinck, Martinus, 5
Beta-binomial distribution
  plant disease incidence and, 537-42
Beta-binomial parameter
  plant disease incidence and, 545
Bigelow, Margaret Barr, 33
Binomial distribution
  plant disease incidence and, 531-36
Biomass
  production of, 123-25
  yield and, 126-30
Biopesticides
  seedborne pathogens and, 459
Bioremediation
  genetically engineered organisms and, 18
Biotypes, 96-98
Bipolaris
  infection of *Sporobolus* ovaries by, 27
Bipolaris maydis Race T, 13
Biverticillium, 51
Black, Lindsay, 6
Blackgram mottle virus
  seed transmission of, 455
Blackjack oak
  fungal mats on, 107
Black oak
  enzymic defenses against disease in, 256
  oak wilt and, 105
Black spot disease, 56
Blast disease, 477
Blastocladiella, 28
Blight, 3-4
Blight Ban A506, 18
Blind seed
  inoculum sources for, 448
Blister rust
  dispersal of, 468-69
Blumeria graminis f.sp. *hordei*, 50, 54
BMV
  See Brome mosaic virus
Bos, L., 69-100
Botanical Society of America, 31
Botryosphaeria, 55
Botrytis, 55
Botrytis cinerea, 291
Box-Jenkins analysis
  plant disease incidence and, 554-56
Box-Jenkins modeling
  plant disease incidence and, 556-57
Boyer, John S., 251-69
Bradyrhizobium japonicum
  host range of, 346
Brakke, Myron, 6
Brassica oleracea
  quantitative disease resistance in
    quantitative trait loci determining, 399
Brassica rapa
  rapid-cycling strains of, 14
Bremia lactucae
  resistance to, 416
British Mycological Society, 31, 70
Broad resistance, 95
Brome mosaic virus (BMV)
  pathogen-derived resistance and, 325-38
Brooklyn Botanic Garden, 6
Brown, D. J. F., 223-42
Brown spot disease, 17, 160-61
  dispersal of, 473
BSA
  See Bulked segregant analysis
Bulked segregant analysis (BSA)
  mapping disease resistance genes and, 395
Buller phenomenon, 375
Burkholderia, 175
Bur oak
  oak wilt and, 105
Byssochlamys, 52

C

Cabbage
  black rot of, 11
Cabbage seedling disease
  seed transmission of, 455
Caenorhabditis elegans, 201
Canadian Phytopathological Society (CPS), 70
Candida albicans, 371
Capsidiol, 12, 280
  plant disease resistance and, 292
Captan
  seedborne pathogens and, 454, 459
Carbon reserves
  plant yield and, 127-28
Carnivore, 78
Carotenoids
  bacterial tolerance to ultraviolet radiation and, 149-50
Carrot
  phytoalexin from, 277
Casbene, 12
Cassava
  harvest index and, 126
Catalase
  as antioxidant in plant cells, 303
Cephalosporium diospyri, 113
Cephalosporium stripe, 433-35
Ceratocystiopsis, 47
Ceratocystis, 40, 46-48, 58
Ceratocystis fagacearum
  origins of, 112-14

Ceratocystis fagacearum Bretz Hunt, 103-15
Ceratocystis ulmi, 87
Cercospora, 55
Cercospora kikuchii
seed disease and, 450
Cereal cyst nematode, 207-8
Cereal rust, 97
Cereals
harvest index and, 126
root rot disease of, 254
CERES-WHEAT, 124
Chemotaxis
foliar bacterial pathogens and, 153-54
Chestnut blight, 104, 114
Chickpea
phytoalexin accumulation in, 283
Chilton, Mary Dell, 15
Chitinase
host specificity in rhizobial infection and, 354-55
predisposition to disease and, 256
Chitosan oligomers
phytoalexin accumulation and, 278
Chlorogenic acid, 277
Choke disease, 45
Ciborina, 55
Circumdati, 53
Citrus nematode, 208
Citrus stubborn disease, 8
Cladistic analysis
molecular data and, 38
nectriaceous fungi and, 41
Cladosporium fulvum
genes encoding resistance to, 409
Clavibacter michiganense subsp. *michiganense*
seed disease and, 450
Clavibacter michiganensis
extracellular polysaccharide of plant pathogenesis and, 178-79
Clavibacter michiganensis ssp. *insidiosus*
assay for, 453
Claviceps fusiformis
seed disease and, 448
Claviceps purpurea
development of sclerotium in, 27
inoculum sources for, 448
Clavicipitales, 40-46
Cleistothecia, 49-54
Clonality
in plant-pathogenic fungi, 369-88
Clonostachys, 44
CMV
See Cucumber mosaic virus
Coccidioides immitis, 371
Cochliobolus, 55
Cochliobolus carbonum
genes encoding resistance to, 409
Cochliobolus heterostrophus
fitness and, 481
intergeneric host specialization and, 478-79
Coconut palm
stem reserves in fruiting and, 128
Collego, 10
Colletotrichum, 48-49, 60
Colletotrichum gloeosporioides, 10, 48-49
Colletotrichum graminicola, 49
Colletotrichum kahawae, 49
Colletotrichum lindemuthianum, 95
Colletotrichum magna
nonpathogenic mutant of, 476
Commensalism, 79
Common bean
disease resistance genes in markers linked to, 396
Competition
plant/pest relationships and, 78
Conidial fungi
classification of, 27
Conidiogenesis, 27
Conifers
Scleroderris cankers of, 55
Contamination, 82-83
Convolvulaceae
phytoalexins in, 280
Coppicing, 108
Coral spot, 41
Coremium, 52
Corn
stalk rot resistance in quantitative trait loci for, 406
Stewart's wilt of, 179-80
Corynebacterium
isolated from aerial leaf surfaces, 158
Cotton
leaf-blight pathogen of, 184
Cowpea
dominant resistance gene *Rk* in, 204
resistance gene systems of, 208
CPS
See Canadian Phytopathological Society
Crick, Francis, 6
Cristulariella, 55
Cristulariella moricola, 55
Cronartium ribicola
dispersal of, 468-69
Crop damage
definition of, 75-76
Crop loss
definition of, 75-76
Cropping system
pyramiding resistance genes in, 216
Crop plants
frost injury to
epiphytic bacteria and, 16
transgenic
virus resistance in, 15
Crop protection science, 69, 82
Crops
harvest index and, 126
management practices of
modifications in, 9-10
pyramiding resistance genes in, 213-16
Cropscan Radiometer System, 501-2
Crop yield, 126-37
biomass and, 126-30
plant disease and, 130-37
Crown gall disease, 187
Crown rust disease, 476
Crucifer Genetics Cooperative, 14
Crucifers
black spot of, 185
Cryphonectria parasitica
genetic exchange and, 374
intercontinental spread of, 112
Cryphonectria parasitica (Murr.) Barr, 104
Cucumber mosaic virus (CMV)
pathogen-derived resistance and, 325-38
seed transmission of, 455
Cultivar-nonspecific pathogenicity, 96
Cultivars, 95
harvest index and, 126
Cultivar-specific pathogenicity, 96
Curtobacterium
isolated from aerial leaf surfaces, 158
Cylindrocarpon, 40-46
Cylindrocladium, 40-46
Cymbidium ringspot virus (CyRSV)
pathogen-derived resistance and, 325-38
CyRSV
See Cymbidium ringspot virus

D

Daidzein
phytoalexin biosynthesis and, 283
Dallisgrass
development of sclerotium in, 27
Davis, Robert, 7

De Bary, H. A., 4, 79
DED
  See Dutch elm disease
Dehydration
  embryo development in vascular plants and, 261-62
  predisposition to plant disease and, 255-56
Dendryphiella salina
  osmotic adjustment in, 264
Denny, T. P., 173-91
Density gradient ultracentrifugation, 6-7
DeVine, 10
Dicotyledons
  phytoalexins isolated from, 279
Digital image analysis
  in plant pathology, 510-12
Diplodia, 55
Discomycetes, 54-55
Disease
  germ theory of, 3-5
  See also Plant disease
Disease index, 490
Disease intensity, 120
DISEASE PRO, 492
Disease progress curve, 551-53
Disorder, 72, 74
DISTRAIN, 492
DNA hybridization assays
  plant pathogens and, 454
DNA polymorphisms
  Meloidogyne and, 206-7
Dollar spot, 55
Dothideales, 56
Downy mildew
  DNA hydridization assay and, 454
  resistance to
    quantitative trait loci for, 406
  seed transmission of, 455
Drechslera, 55
Dutch elm disease (DED), 47, 87, 104
  vector system of, 106-7
Dwarf mistletoe, 9-10

E

Ectoparasite, 80
Ectopathogen, 81
Eicosatetranoic acid
  active oxygen production in tobacco cells and, 312
Elicitors, 278
ELISA
  See Enzyme-linked immunosorbent assay
Elm bark beetles
  Dutch elm disease and, 106-7
Emericella, 53
Emericella nidulans
  genetic exchange and, 374
Endoparasite, 80
Endophytic bacteria, 146-47
Environment
  oak wilt and, 109-10
  plant/pest relationship and, 84-85
Environmental Protection Agency, 17
Enzyme-linked immunosorbent assay (ELISA)
  plant pathology and, 453
Epichloe, 40, 59
Epichloe typhina, 45
Epiphytic bacteria, 146-47
  role in frost injury, 16-18, 160
EPSs
  See Extracellular polysaccharides
Ergot
  inoculum sources for, 448
Ergot fungus, 3
Erwinia amylovora, 155
  extracellular polysaccharide of plant pathogenesis and, 179-82
Erwinia carotovora
  dispersal of, 473
  survival on dry leaves, 150
Erwinia herbicola
  isolated from aerial leaf surfaces, 158
  survival on dry leaf surfaces, 157
  tolerance to ultraviolet radiation, 150
Erwinia herbicola pv. *gypsophilae*, 155
Erwinia stewartii
  enzyme-linked immunosorbent assay and, 453
  extracellular polysaccharide of plant pathogenesis and, 179-82
Erysiphe graminis
  virulence alleles of
    fitness effects of, 480
Erysiphe graminis f.sp. *tritici*, 203
Escherichia
  survival on dry leaves, 150
Esterase isozyme polymorphisms
  Meloidogyne and, 206
ESTIMATE, 492
Ethylene
  phytoalexin accumulation and, 278
Etridiazole
  seedborne pathogens and, 459
Eupenicillium, 51
Eupenicillium crustaceum, 51
European white birch
  stem canker of
    low water potentials and, 258
Europhium, 47
Eurotiales, 50-54
Eurotium, 53
Exserohilum turcicum
  resistance to
    quantitative trait loci for, 402
Extracellular polysaccharides (EPSs)
  host specificity in rhizobial infection and, 353-54
  plant pathogenesis and, 173-91
Eyespot, 435-38

F

Fatty acids
  phytoalexin accumulation and, 278
FBPP
  See Federation of British Plant Pathologists
Federation of British Plant Pathologists (FBPP), 70
Fischer, Alfred, 4
Fitness, 480-83
Flavobacterium
  isolated from aerial leaf surfaces, 158
Flavonoids
  as host-specific signals to *Rhizobium*, 352-53
Flax
  disease resistance genes in isolation of, 409
Food deprivation
  plant/pest relationships and, 78
Forest trees
  management practices of
    modifications in, 9-10
Forma specialis, 97
Frost injury
  epiphytic bacteria and, 16-18, 160
Fungal speciation
  host specificity and, 59-60
Fungi
  conidial
    classification of, 27
  late blight disease of potato and, 4
  osmotic adjustment in, 264-65
  plant-pathogenic
    clonality in, 369-88
  pyrenomycetous, 39-49
  sexual and asexual reproduction in
    genetic consequences of, 371-72
  smut, 27
Fungicides
  seed treatment and, 458

Fungi Imperfecti, 37, 39
Fungitoxicity
phytoalexins and, 284-85
Furcatum, 51
Fusarium, 30, 40-46
taxonomy of, 41-43
Fusarium buxicola, 42-43
Fusarium graminearum
intergeneric host specialization and, 478
seed disease and, 448
Fusarium moniliforme, 43
seed disease and, 448
Fusarium oxysporum, 42
resistance to
quantitative trait loci for, 402
Fusarium oxysporum f.sp. *pisi* r.2, 97
Fusarium oxysporum lycopersici
intergeneric host specialization and, 478
Fusarium roseum f.sp. *cerealis*, 252
root rot disease of cereals and, 254
Fusarium solani, 43
Fusarium staphyleae, 43
Fusarium tabacinum, 48

G

Gaeumannomyces graminis, 477
Gaunt, R. E., 119-39
GEMs
See Genetically engineered microorganisms
Genetically engineered microorganisms (GEMs), 467-68
dispersal of plant pathogens and, 474-75
ecological niche and, 479-80
plant pathogen fitness and, 483
Genetic analysis
molecular data and, 38
Genetic engineering
modified tumor-inducing factor and, 15
Genetic individual, 372-73
identification of, 373
origins in populations, 374-75
Genetic mapping
plant disease resistance genes and, 394-97
Genistein
phytoalexin biosynthesis and, 283
Georgia Experiment Station, 23, 25, 27, 32, 34
Germplasm
disease resistance genes and, 403-4
seedborne pathogens and, 457-58
Gibberella, 40-41
natural groups of, 42
Gibberella fujikuroi, 10, 43
genotypic variability in, 370
Gibberella pulicaris, 60
Gibberellic acid, 11
Gibberellins, 10-11
Gliocladium, 40-46
Gliocladium penicillioides, 43-44
Gliocladium roseum, 41, 43-44
Gliocladium virens, 43-44
Globodera pallida, 205, 207
Globodera rostochiensis, 205, 207
Gloeotinia temulenta
inoculum sources for, 448
Glomerella, 48-49
Glomerella cingulata, 44, 48
β-1,3-Glucanase
plant disease resistance and, 290-91
predisposition to disease and, 256
β-Glucans, 174
Glyceollin, 12
accumulation in soybean, 278
biosynthesis of, 283
fungitoxicity of, 284-85
Glycine soja
root nodule formation and, 357
Glycinoeclepin A, 12
Gramineae
phytoalexins in, 280
Grapevine fanleaf nepovirus
vector of, 223, 231
Grapevines
Pierce's disease of, 8
Green area duration
crop yield and, 133
Green bean
phytoalexin accumulation in, 278
Gremmeniella, 55

H

Haber-Weiss reaction, 302
Halo blight, 160
Hanlin, Richard T., 23-34
Harvest index, 126
Heat
seedborne pathogens and, 459
Helminthosporium
interspecific crosses among, 478
Helminthosporium complex, 23, 27
Helminthosporium sativum complex, 27
Helminthosporium turcicum, 16
Helotiales, 54
Herbivore, 78
Herpotrichiellaceae, 56
Heterobasidion annosum
somatic recombination in, 375
Heterodera avenae, 207-8
Heterodera glycines, 207
Heterodera humuli, 223
Higgins, B. B., 28-29, 33
Hircinol, 277
Histoplasmosis, 49
HMGR
See Hydroxymethylglutaryl coenzyme A reductase
Holmes, Francis, 5
Holy Fire, 3
Hop cyst nematode, 223
Hoppe, Paul, 16
Hops
nettlehead disease of, 223
Horizontal pathogenicity, 96
Horizontal resistance, 96
Host, 79, 88-95
sensitivity and tolerance of, 90-93
susceptibility and resistance of, 89-90
vulnerability of, 93-95
Host/parasite relationship
establishment of, 82-84
schematic analysis of, 85-95
specific, 96-97
Host-plant resistance (HPR)
root-knot nematodes and, 199-217
Host specificity
fungal speciation and, 59-60
HPR
See Host-plant resistance
HR
See Hypersensitive response
Hughes, G., 529-60
Hydrogen peroxide
in plants, 300-2
Hydroxyl radical
in plants, 300-2
Hydroxymethylglutaryl coenzyme A reductase (HMGR)
acetate-mevalonate pathway and, 281
Hypersensitive cell death
active oxygen and, 312-13
Hypersensitive response (HR), 84, 91
active oxygen production during, 305-6
Hypocrea, 40-41
Hypocrea gelatinosa, 44
Hypocrea jecorina, 46
Hypocreales, 40-46
Hypomyces, 40-41
Hypoxylon atropunctatum
oak wilt pathogen and, 109-10

I

Immunity, 84
Incompatibility, 96
Index of dispersion
  plant disease incidence and, 545-46
Infection, 82
Infectious disease, 74
Infestation, 82-83
Infrared thermography
  in plant pathology, 504-8
Injury
  See Plant injury
Inoculation, 83
Inorganic salts
  phytoalexin accumulation and, 278
International Rules for Seed Testing 1993, 456
Ipomeamarone, 277
Iprodione
  seed treatment and, 458
Isarioidea, 52
Isoflavonoids, 12
Isolates, 97
Iwanowski, Dimitri, 5

J

Japanese pear
  black spot disease of, 56
Jones, Stephen S., 429-39

K

Kalanchoe daigremontiana, 190
Karnal bunt, 458
Kelco Company, 11
Kelman, Arthur, 1-19
Kentucky bluegrass
  Sclerotinia dollar spot of, 253
Kievitone
  accumulation in green bean, 278
Kievitone hydratase
  virulence and, 287
Koch, Robert, 3-4
Kohn, Linda M., 369-88
Koshimuzu, Kaoru, 7
Kuc, Joseph, 275-93
Kurosawa, E., 10

L

Laser-induced fluorescence
  in plant pathology, 508-10
Latency, 73-74
LCOs
  See Lipo-chitin oligosaccharides
Leaf area index
  radiation interception and, 123
Leaf-spot disease
  extracellular polysaccharide and, 183-85
Leaf surfaces
  bacteria on
    adaptations to avoid environmental stresses, 151-56
    adaptations to tolerate environmental stresses, 148-51
  location of, 147-48
Least-squares regression
  plant disease incidence and, 551-52
Lecanorales, 54
Lectins
  host specificity in rhizobial infection and, 354
Legumes
  bacterial wilt of, 178
  harvest index and, 126
Leguminosae
  phytoalexins in, 279-80
Leptosphaeria, 55-56
Lettuce
  disease resistance genes in, 395
    markers linked to, 396
    recessive, 416
Lettuce mosaic virus
  inoculum thresholds for, 455-56
Levan, 180, 183
Lindeman, Julie, 17
Lindow, Steven E., 17-18, 145-65
Linear regression
  plant disease incidence and, 553-54
Lipo-chitin oligosaccharides (LCOs)
  biosynthesis and secretion of, 348-52
  host specificity in nodule induction and, 353
Lipopolysaccharide (LPS) O-antigen, 174
Lipoxygenases
  active oxygen production during plant/pathogen interactions and, 311-12
Live oak
  oak wilt and, 107, 111-12
Loculoascomycetes, 55-56
Lomonossoff, George P., 323-39
Longidorids, 224-25
Longidorus elongatus, 224
Loroglossol, 277
Lotus preslii
  root nodule formation and, 357
Luminol-mediated chemiluminescent (LDC) assay, 304
Luteoviruses
  barley yellow dwarf disease and, 431-32
Luttrell, Everett Stanley, 23-34
Luttrellia, 31
Lycopersicon peruvianum, 205
Lysozyme
  predisposition to disease and, 256

M

Maackiain
  accumulation in chickpea, 283
  fungitoxicity of, 286
MACROS, 124
Madden, L. V., 529-60
Magnaporthe grisea, 205
  blast disease and, 477
  clonal lineages of, 373
  clone diversity in, 384
Maize
  disease resistance genes in
    isolation of, 409
    markers linked to, 397
  embryo development in
    dehydration and, 261
  quantitative disease resistance in
    quantitative trait loci determining, 400
Malate dehydrogenase isozyme polymorphisms
  Meloidogyne and, 206
Male sterility
  sensitivity to toxic moieties and, 13-14
Marker-aided selection (MAS)
  plant disease resistance and, 404-7
MAS
  See Marker-aided selection
Matric potential
  bacteria on drying leaf surfaces and, 150-51
Mayer, Adolf, 5
McGee, Denis C., 445-61
MDOs
  See Membrane-derived oligosaccharides
Medicago sativa
  nodulin gene of, 356-57
  root nodule formation and, 357-58
Medicarpin
  accumulation in chickpea, 283
Melanospora, 58
Meloidogyne, 199-217
  genetic variability in, 201-12
  host range of, 201-6
  management of, 212-16
  molecular, biochemical, morphological markers in, 206-7
  race and biotype schemes for, 207-12
  virulence characteristics of, 201-6
Meloidogyne incognita, 415

Membrane-derived oligosaccharides (MDOs), 186
Metalaxyl
seedborne pathogens and, 459
seed treatment and, 458
Methomyl, 13
6-Methoxymellein, 277
Methylobacterium
isolated from aerial leaf surfaces, 158
Methylobacterium organophilum
survival on dry leaf surfaces, 157
Methylotrophs
pink-pigmented, facultative, 158
Michelmore, R., 393-421
Microascales, 47
Microdochium nivale, 43
Microwave remote sensing
in plant pathology, 510-12
Mildew, 83
downy, 50, 54, 57, 80, 99
DNA hybridization assay and, 454
seed transmission of, 455
powdery
resistance to, 406
Miller, Julian H., 28
MLOs
See Mycoplasma-like organisms
Molecular markers
plant disease resistance and, 393-421
Monascus ruber, 49-50
Monilinia, 55
Morisita's index
plant disease incidence and, 546
Morrena odorata Lindl., 10
Motility
foliar bacterial pathogens and, 153-54
MSA
See Mycological Society of America
Mulberry ringspot virus
vector of, 230
Mundt, C. C., 467-83
Mung bean
quantitative disease resistance in
quantitative trait loci determining, 399
Murray, Timothy D., 429-39
Mutualism, 79
Mycoherbicides
plast pathogens as, 10
Mycological Society of America (MSA), 28, 31, 33
Mycology
plant pathology and, 23-34
systematic, 38
Mycoplasma-like organisms (MLOs)
as disease agents, 7-8
Mycosphaerella, 55
Mycosphaerella fijiensis, 56
Mycosphaerella graminicola
spatial clustering of, 470
Mycosphaerella musicola, 56
Myriosclerotinia, 55

N

NADPH oxidase
active oxygen production during plant/pathogen interactions and, 309-10
National Science Foundation, 32
Educational Materials Development Program, 14
Natural vulnerability, 94-95
Near-isogenic lines (NILs)
mapping disease resistance genes and, 394-95
Nectria, 40-41
natural groups of, 42
Nectria episphaeria, 42
Nectria haematococca, 41-43
host range of, 478-79
virulence of
pisatin detoxification and, 287
Nectria lugdunensis, 60
Nectria ochroleuca, 44
Nectria penicillioides, 42
Nectria rigidiuscula, 42
Nectria ventricosa, 42
Negative binomial distribution
plant disease incidence and, 542
Nematode egg-hatching factor, 12
Nematodes
plant
virus transmission by, 223-42
root-knot, 199-217
management of, 212-16
virus-vector, 224-26
Nematode-transmitted viruses, 226-27
Neocosmospora, 41
Nepoviruses
nematode-transmitted, 223, 226-27
vectors of, 223-24
Nester, Eugene, 15
Netherlands Society of Plant Pathology, 70-71, 85
Nettlehead disease, 223
Neurospora, 28
Neurospora crassa, 43, 59
wild-collected strains of
sexual diplophase in, 375
Newton-Raphson procedure, 539
NILs
See Near-isogenic lines
Nilsson, H.-E., 489-513
Nitidulids
as vectors for oak wilt, 106
Nivalenol, 43
Nomuraea, 52
Nonhost, 84
Nonimmunity, 89
Noninfectious disease, 74
Nonpathogenic parasitism, 98-99
Nonsuscept, 84
Northern corn leaf blight, 401
Northern jointvetch
biological control of, 10
Northern leaf blight, 16
Northern pin oak
coppicing by, 108
Northern red oak
oak wilt and, 105
Nuclear magnetic resonance imaging
in plant pathology, 512

O

Oak bark beetles
oak wilt and, 106-7
Oak wilt, 103-15
environment and, 109-10
host response and, 105-7
management of, 110-12
stand composition and, 107-9
Oats
cereal rust on, 97
crown rust disease of, 476
disease resistance genes in
markers linked to, 397
halo blight of, 160
Oligogalacturonides
active oxygen response and, 308
Oligoglucans
phytoalexin accumulation and, 278
Onygenales, 50
Ophiobolus graminis, 254
Ophiostoma, 40, 46-48, 58
Ophiostoma novoulmi, 47
Ophiostoma ulmi
intercontinental spread of, 112
Ophiostoma ulmi (Buisman) Nannf., 104
Orchid
phytoalexin from, 277
Orchinol, 277
Orlandi, Elizabeth, W., 299-316
Oryza sativa
blast disease of, 477
Osmotic adjustment
plant disease and, 264-65

Osmotic potential
bacteria on drying leaf surfaces and, 150-51
Osmotolerance
bacteria on leaf surfaces and, 150
Owen, John, 28-29
Oxygen
See Active oxygen
Ozone injury
photosynthetic rate and, 491

P

Paecilomyces, 51-52
Parasexuality
genetic exchange and, 375
Parasite, 80, 86-88
aggressiveness of, 87
pathogenicity of, 88
virulence of, 88
See also Host/parasite relationship
Parasite-specific resistance, 95-96
Parasitism, 79-80
nonpathogenic, 98-99
Parasitoid, 80
Parasponia andersonii, 346
Paratrichodorus minor, 224
Paratrichodorus pachydermus, 224
Parlevliet, J. E., 69-100
Pasteur, Louis, 3-4
Pasture legumes
bacterial wilt of, 178
Pathogen, 72, 81
Pathogen-derived resistance (PDR), 323-39
application of, 324-25
characteristics of, 325-28
cosuppression and, 336-37
mechanism of, 328-38
protein-mediated, 332-34
RNA-mediated, 334-35
Pathogenicity, 88
cultivar-nonspecific, 96
cultivar-specific, 96
horizontal, 96
vertical, 96
Pathogenism, 81
Pathogens
See Plant pathogens
Pathology, 72
See also plant pathology
Pathotype, 98
Pathovar, 97
PCR
See Polymerase chain reaction
PDR
See Pathogen-derived resistance
Pea
disease resistance genes in
markers linked to, 397
pisatin accumulation in, 278
quantitative disease resistance in
quantitative trait loci determining, 399
Peach rosette mosaic virus
vector of, 231
Pea early browning virus (PEBV)
pathogen-derived resistance and, 325-38
vector of, 230
Pear
fire blight of, 179-80
Pearl millet
downy mildew in
resistance to, 406
quantitative disease resistance in
quantitative trait loci determining, 400
Pea seedborne mosaic virus (PsbMV), 457
PEBV
See Pea early browning virus
PEG
See Polyethylene glycol
Penicilliopsis, 52-53
Penicillium, 50-54
seed disease and, 451
Pepper
leaf-spot disease of, 183
phytoalexins in, 280
Pepper ringspot virus
vector of, 230
Peronosclerospora sorghi
DNA hybridization assay and, 454
Peronospora ducometi
seed transmission of, 455
Peroxidases
active oxygen production during plant/pathogen interactions and, 310-11
Persimmon wilt, 113
Pesticides
phytoalexins as, 289-90
Pests
definition of, 76-78
See also Plant/pest relationship
Pezizales, 54
Phaeosphaeria, 55
Phaseolin, 95, 277
accumulation in green bean, 278
fungitoxicity of, 286
Phaseolus vulgaris
mesophyll air space in, 148
root nodule formation and, 357
Phenetic analysis
molecular data and, 38
Phoma, 60
Phoma lingam
inoculum thresholds for, 455
Phomopsis, 60
Phomopsis longicolla
seed disease and, 448, 454
seed quality testing and, 452
Photogrammetry
in plant pathology, 497-99
Photography
in plant pathology, 497-99
Photosynthate, 258-59
Photosynthesis
low water potentials and, 258-60
plant yield and, 127-28
Photosynthetic rate
plant disease and, 125
Physiologic race, 97
Phytoalexins, 275-93
biosynthesis of, 281-84
detoxification of, 286-87
distribution and structure of, 279-81
elicitation of
active oxygen and, 315
factors influencing activity of, 285-86
fungitoxicity of, 284-85
as pesticides, 289-90
plant disease resistance and, 284-89
stereoisomers of, 287-88
suppression of accumulation of, 288-89
Phytopathogenic bacteria
extracellular polysaccharides produced by, 176-77
Phytophthora, 95
genotypic variability in, 370
Phytophthora infestans, 79, 125
clone diversity in, 384
fitness of isolates of, 482-83
resistance of potato to, 276-77
resistance to
quantitative trait loci for, 401-2
survival during dispersal, 474
Phytophthora nicotianae var. *nicotianae*
seed disease and, 451
Phytophthora palmivora, 10
Pierce's disease
causal agent of, 8
Pinus strobus
blister rust of, 468-69
Pisatin, 12, 277
accumulation in pea, 278
detoxification by pisatin demethylase, 287
fungitoxicity of, 285
Pisum sativum
nodulin gene of, 356-57

Plant breeding
advances in, 13-15
pest resistance and, 96
Plant disease
definition of, 72-74
dispersal of infective units and, 468-75
endophytic population size and, 162-63
epiphytic population size and, 160-62
growth and development and, 124-25
impact on mankind, 3
incidence of, 529-60
characterizing heterogeneity of, 544-51
statistical distributions for, 531-44
temporal analyses of, 551-59
measurement of, 120-23
mycoplasma-like organisms as agents of, 7-8
phytoalexins and, 275-93
predisposition to
water deficits and, 251-69
severity of
yield and, 119-39
spiroplasmas as agents of, 7-8
tolerance to, 92
viruses as agents of, 5-7
visual assessments in, 490-92
yield and, 130-37
See also Seed disease
Plant disease resistance
active oxygen and, 299-316
alien sources of, 430-38
development in wheat, 429-39
marker-aided selection and, 404-7
phytoalexins and, 284-89
quantitative, 398-403
transgenes and, 419-20
Plant disease resistance genes, 393-421
cloned
transgenic strategies for using, 414-16
cloning of, 409-11
combinations and deployment of, 407-8
evolution of new specificities, 416-18
genetic mapping of, 394-97
markers linked to, 396-97
mechanistic classes of, 411-14
molecular isolation of, 409-11
selection of new specificities, 418-19
wild germplasm and, 403-4
Plant genetics
advances in, 13-15
Plant injury
definition of, 74-75
Plant nematodes
virus transmission by, 223-42
Plant pathogenesis
active oxygen in, 299-316
bacterial polysaccharides and, 173-91
Plant-pathogenic fungi
clonality in, 369-88
Plant/pathogen relationship
active oxygen production during, 305-9
sources of, 309-12
Plant pathogens
chemical compounds produced by, 10-12
fitness of, 480-83
genetically engineered microorganisms and, 474-75
intergeneric host specialization and, 478-79
interspecific host specialization and, 476-78
intraspecific host specialization and, 475-76
as mycoherbicides, 10
nocturnal dispersal of, 468-69
splash dispersal of, 469-70
turbulent dispersal of, 470-72
Plant pathology
active and passive remote sensing in, 508
definition of, 82
digital image analysis in, 510-12
ground-based and hand-held remote sensing in, 500-2
infrared thermography in, 504-8
instrumental remote sensing in, 492-97
laser-induced fluorescence in, 508-10
mycology and, 23-34
nuclear magnetic resonance imaging in, 512
photography, aerial photography, photogrammetry in, 497-99
radar and microwave remote sensing in, 510
satellite-borne and aerial radiometry in, 499-500
videography in, 502-4
visual disease assessments in, 490-92
Plant/pest relationship, 69-100
abiotic factors and, 99
environment and, 84-85
establishment of, 82-84
nonpathogenic, 98-99
schematic analysis of, 85-95
types of, 78-81
Plant protection science, 82
Plants
active oxygen in, 300-5
antioxidant mechanisms of, 302-3
growth and development of, 123-24
effect of disease on, 124-25
reaction to rhizobial infection, 355-61
See also Transgenic plants
Plant viruses
pathogen-derived resistance to, 323-39
Plasmopara lactucae-radicis
resistance to, 416
Plectomycetes, 49-54
Plectosphaerella cucumerina, 44, 48
Plectosporium tabacinum, 48
Pleospora, 56
Pleosporales, 56
PLRV
See Potato leafroll virus
Podostroma, 45
Poisson distribution
plant disease incidence and, 542
Polyethylene glycol (PEG)
infection in bean seeds and, 459
Polygalacturonases
active oxygen response and, 308
Polymerase chain reaction (PCR), 38
Meloidogyne and, 206
Polypeptides
phytoalexin accumulation and, 278
Polyribosomes
plant disease and, 256-58
Ponderosa pine
dwarf mistletoe and, 9-10
Potato
disease resistance in, 276-77
disease resistance genes in
markers linked to, 396
dominant resistance genes in, 205
harvest index and, 126
late blight disease of, 4
quantitative disease resistance in
quantitative trait loci determining, 399
ring rot of, 178-79
Potato leafroll virus (PLRV)
pathogen-derived resistance and, 325-38
Potato spindle tuber disease
viroid causing, 8

Potato virus S (PVS)
pathogen-derived resistance and, 325-38
Potato virus X (PVX)
pathogen-derived resistance and, 325-38
Potato virus Y (PVY)
pathogen-derived resistance and, 325-38
Powdery mildew, 50, 54, 57, 80, 99
resistance to
quantitative trait loci for, 406
Power law
plant disease incidence and, 546-49
Predator, 78
Predisposition, 84-85
Prevost, I. B., 3
Prokaryotes
superoxide dismutase in, 303
Propagules
nocturnal dispersal of, 468-69
splash dispersal of, 469-70
Propiconazole
oak wilt and, 112
Protein polymorphisms
Meloidogyne and, 206
PsbMV
See Pea seedborne mosaic virus
Pseudocercosporella herpotrichoides, 435-38
Pseudomonas aeruginosa
alginate biosynthetic genes of, 183
Pseudomonas fluorescens
ice-nucleation activity and, 18, 481
isolated from aerial leaf surfaces, 158
Pseudomonas phaseolicola
agglutination test for, 453
Pseudomonas solanacearum
extracellular polysaccharide of plant pathogenesis and, 175-78
resistance to
quantitative trait loci for, 401
Pseudomonas syringae, 17
extracellular polysaccharide of plant pathogenesis and, 183-87
ice-nucleation activity and, 481
osmosensitive mutants of, 150
pathogenic
survival on dry leaf surfaces, 157
pathovars of
cloned avirulence gene transfer between, 415
survival during dispersal, 474
tolerance to ultraviolet radiation, 149
Pseudomonas syringae pv. *lachrymans*
survival on pubescent leaves, 152
Pseudomonas syringae pv. *maculicola*
genes encoding resistance to, 409
Pseudomonas syringae pv. *phaseolicola*
chemotaxis and, 154
DNA hybridization assay and, 454
inoculum thresholds for, 455
interaction with host, 156
rifampin-resistant, 151
seed disease and, 449
Pseudomonas syringae pv. *savastanoi*, 155
Pseudomonas syringae pv. *syringae*, 155
dispersal of, 473
host range of, 157-58
hrpM locus in, 186
Pseudomonas syringae pv. *tomato*
genes encoding resistance to, 409
multiplication in host plants, 158
survival on dry leaf surfaces, 152
Puccinia graminis, 99
dispersal of, 472-73
Puccinia graminis f.sp. *avenae*, 97
Puccinia graminis f.sp. *tritici*, 97
PVS
See Potato virus S
PVX
See Potato virus X
PVY
See Potato virus Y
Pyrenomycetes, 39-49
Pythium, 121

Q

QTL
See Quantitative trait loci
Quantitative trait loci (QTL), 398-403
marker-aided selection and, 406-7
Quercus
oak wilt epidemic and, 103-15

R

Race-nonspecific resistance, 96
Race-specific resistance, 96
Radar remote sensing
in plant pathology, 510-12
Radiometry
in plant pathology, 499-500
Random amplified polymorphic DNA (RAPD)
plant disease resistance genes and, 395
Ranunculus ficaria, 386
RAPD
See Random amplified polymorphic DNA
Raspberry ringspot virus
vector of, 230
Recombinant DNA, 15
Red oak
enzymic defenses against disease in, 256
oak wilt and, 105
Resistance, 89-90
broad, 95
horizontal, 96
Meloidogyne and, 212-16
parasite-specific, 95-96
race-nonspecific, 96
race-specific, 96
vertical, 96
See also Pathogen-derived resistance; Plant disease resistance
Restriction fragment length polymorphisms (RFLPs)
oak wilt epidemiology and, 113-14
Resveratrol
plant disease resistance and, 291-92
RFLPs
See Restriction fragment length polymorphisms
Rhicadhesin, 190
Rhizobia
host recognition by determinants of, 352-55
infection and nodulation by, 345-61
infection threads and, 356-57
lipo-chitin oligosaccharides of biosynthesis and secretion of, 348-52
host specificity and, 353
nod, *nol*, *noe* genes of regulation of, 348
root hair curling and, 355-56
root nodule and, 357-58
Rhizobial infection
reaction of plants to, 355-61
Rhizobium leguminosarum biovar *trifolii*
host range of, 346
Rhizobium leguminosarum biovar *viciae*
host range of, 346
NodO protein of, 352
Rhizobium meliloti
host range of, 346

Rhizoctonia solani
genotypic variability in, 370
Rhynchosporium secalis
spatial clustering of, 470
Rice
blast disease of, 477
"foolish seedling" disease of, 10
quantitative disease resistance in
quantitative trait loci determining, 400
Rice blast fungus, 205
Rifkin, Jeremy, 17
Rishitin, 280
Roberts, P. A., 199-217
Robertson, W. M., 223-42
Robigus, 3
Root disease
synergistic development of, 121
Root grafts
oak wilt and, 108
Root hair curling
rhizobial infection and, 355-56
Root-knot nematodes, 199-217
management of, 212-16
Root rot disease, 254
Root-tip galls, 225
Rothamsted Agricultural Experiment Station (England), 6
Rusts, 4, 83
interspecific host specialization of, 476
Rye
take-all disease of, 477
Ryegrass blast epidemic, 477-78

S

Sago palm
stem reserves in
fruiting and, 128
Saint Anthony's Fire, 3
Salmonella
survival on dry leaves, 150
Samuels, G. J., 37-61
Saprophytes
foliar bacterial pathogens and, 159-60
survival on leaf surfaces, 158-59
Sarawakus, 45
Sarophorum, 52
Scabrum rust, 476
Scarlet oak
oak wilt and, 105
Scleroderris cankers, 55
Sclerotiniaceae, 55
Sclerotinia homeocarpa, 55
Sclerotinia sclerotiorum, 50, 55
dispersive clones of, 381-87
seed disease and, 450-51
Sclerotium, 55
Sclerotium cepivorum, 55
Sclerotium rolfsii
genotypic variability in, 370
Scopoletin, 277
plant disease resistance and, 292
Secondary metabolites
formation by infected plants, 11-12
Seed-borne pathogens
transmission of, 455-60
Seed development
disease management during, 448-49
Seed disease, 445-61
management during harvesting and processing, 450-51
management during storage, 451
seedling emergence and establishment and, 454-55
seed management systems and, 446
seed production field and, 446-50
Seed health testing, 452-54
Seedling emergence
seed disease and, 454-55
Seed maturation
disease management during, 449-50
Seed quality tests
interaction of pathogens with, 452
Seifert, K. A., 37-61
Senescence syndrome, 490
Sensitivity, 90-93
Septoria tritici, 121
dispersive clones of, 384
Serotype, 98
Sesquiterpenoids, 12
Shading
crop yield and, 132
SHMV
See Sunn-hemp mosaic virus
Sigatoka leaf disease, 56
Smith, Erwin F., 4
Smut fungi, 27
Smuts, 4
Snowmax, 18
SOD
See Superoxide dismutase
Solanaceae
phytoalexins in, 280
Solar radiation
biomass production and, 123-24
Sordaria fimicola
genetic exchange and, 374
Sordariales, 47
Sorghum
seedborne pathogens of, 454
Southern corn leaf blight, 13
Soybean
disease resistance genes in markers linked to, 396
glyceollin accumulation in, 278
purple seed stain of, 450
quantitative disease resistance in
quantitative trait loci determining, 399
Soybean cyst nematode, 12, 207
Spaink, Herman P., 345-61
Spanish oak
fungal mats on, 107
Species, 97
Spiroplasmas
as disease agents, 7-8
Sporobolus ovaries
infection by *Bipolaris*, 27
Sporothrix, 47-48
Sporothrix schenkii, 48, 58
Sporotrichosis, 48
Spring wheat
dwarfing genes in
yield and, 127
Stanley, Wendell, 5-6
Starr, Mortimer, 11
Stem canker
low water potentials and, 258
Stenotrophomonas maltophilia
survival on dry leaf surfaces, 157
Stewartan, 180-82
Stilbenes, 12
Stilbodendron, 52
Stilbothamnium, 52-53
Stilbothamnium togoense, 53
Strain, 98
Stranglervine
biological control of, 10
Striga asiatica, 12
Strigol, 12
Stripe rust
resistance to, 13
Stylosanthes, 48
Sugar beet
harvest index and, 126
Sugar maple
enzymic defenses against disease in, 256
Sunn-hemp mosaic virus (SHMV)
pathogen-derived resistance and, 325-38
Superoxide
in plants, 300-2
Superoxide dismutase (SOD)
in plants, 302-3
Suscept, 83
Susceptibility, 89-90
Sweet potato
phytoalexins from, 277
SWHEAT, 124
Symbionin, 240

Symbiont, 79
Symbiosis, 78-80
Syndrome, 73
Syringomycin, 155
Systematic mycology, 38
Systematics
  of filamentous ascomycetes, 37-61

T

Take-all disease, 477
Talaromyces, 51-52, 59
Temperature
  oak wilt and, 109
Templeton, George E., 10
Tentoxin, 12
TEV
  See Tobacco etch virus
Texas
  oak wilt epidemic in, 103-15
Texas cytoplasmic male sterility (Tcms) factor, 13
Thermoascus, 52
Thiram
  seedborne pathogens and, 454
Tilletia indica, 458
  seed disease and, 454
Ti plasmid
  DNA of
    tumor-inducing segment of, 15
TMV
  See Tobacco mosaic virus
Tobacco
  disease resistance genes in
    isolation of, 409
  hypersensitivity in
    elicitation of, 415
  phytoalexins in, 280
  transgenic
    resistance to disease in, 291-92
    sensitivity to methomyl, 13
Tobacco etch virus (TEV)
  pathogen-derived resistance and, 325-38
Tobacco mosaic disease, 5
Tobacco mosaic virus (TMV), 5-6
  pathogen-derived resistance and, 325-38
Tobacco rattle tobravirus
  nematode transmission of, 229
  vector of, 224
Tobacco vein mottling virus (TVMV)
  pathogen-derived resistance and, 325-38
Tobraviruses
  nematode-transmitted, 226-27
  vectors of, 224
Tolerance, 90-93, 145, 147
Tomato
  bacterial canker of, 178
  disease resistance genes in
    isolation of, 409
    markers linked to, 396
  leaf-spot disease of, 183
  quantitative disease resistance in
    quantitative trait loci determining, 399
  resistance gene systems of, 208
  stem reserves in
    fruit development and, 128
Tomato black ring nepovirus
  vector of, 224
Tomato black ring virus
  vector of, 230
Tomato spotted wilt virus (TSWV)
  pathogen-derived resistance and, 325-38
Transgenes
  plant disease resistance and, 419-20
Transgenic plants
  development with virus resistance, 15
Transgenic tobacco
  resistance to disease in, 291-92
  sensitivity to methomyl, 13
Transposon tagging
  plant disease resistance genes and, 409-10
Triadimenol
  seed treatment and, 458
Trichoderma, 40-46
Trichoderma hamatum, 45
Trichoderma harzianum, 45
Trichoderma longibrachiatum, 46
Trichoderma reesei, 46
Trichoderma virens, 44
Trichoderma viride, 46
Trichodorids, 225-26
Triticum
  disease resistance in
    development of, 429-39
Trudgill, D. L., 223-42
TSWV
  See Tomato spotted wilt virus
Tubercularia, 43
Turgor pressure
  irreversible growth and, 263-64
Turnip mosaic virus
  resistance to, 416
TVMV
  See Tobacco vein mottling virus
Tylenchulus semipenetrans, 208

U

Ultracentrifugation
  density gradient, 6-7
Ultraviolet radiation
  bacteria on leaf surfaces and, 149-50
Umbelliferae
  phytoalexins in, 280
Umbelliferone, 277
Upper, Chris, 16-17
Uromyces phaseoli, 95
USDA Soil Conservation Service, 25

V

Vali, Gabor, 17
Vascular disease
  extracellular polysaccharide and, 185
Vascular plants
  embryo development in
    dehydration and, 261-62
  osmotic adjustment in, 264
  water deficits and, 265-68
Vectors, 81-82
Verpatinia, 55
Vertical pathogenicity, 96
Vertical resistance, 96
Verticillium, 40-46
Verticillium albo-atrum, 256
  genotypic variability in, 370
Verticillium dahliae, 44, 125
Verticillium lecanii, 44
Vicia sativa
  root nodule formation and, 357
Videography
  in plant pathology, 502-4
Vigna unguiculata
  dominant resistance gene *Rk* in, 204
Viniferin, 12
Viroids
  potato spindle tuber disease and, 8
Virulence, 71, 88, 96-97
  Meloidogyne, 201-6
Viruses
  as agents of disease, 5-7
  as disease vectors, 81-82
  nematode transmission of, 223-42
    criteria for demonstrating, 227
    specificity of, 231-33
    virus transmission test procedures and, 229-30
  nematode-transmitted, 226-27
    ingestion, retention, transmission of, 235-40
    vector efficacy and, 233-35
  pathogen-derived resistance to, 323-39
Virus-vector nematodes, 224-26

Vulnerability, 93-95
  agronomic, 95
  natural, 94-95

W

Water deficits
  crop yield and, 132
  predisposition to plant disease and, 251-69
  vascular plants and, 265-68
Watson, James, 6
Weber-Fechner law, 490
Weeds
  crop infection/infestation and, 81
  definition of, 77-78
Wheat
  cereal rust on, 97
  covered smut of, 3
  disease resistance in development of, 429-39
  disease resistance genes in markers linked to, 397
  karnal bunt of, 458
  leaf necrosis in, 121
  stripe rust in resistance to, 13
  take-all disease of, 477
  See also Spring wheat
Wheat curl mite, 432-33
Wheat stem rust
  dispersal of pathogen in, 472-73
Wheat streak mosaic disease, 432-33
White ash
  development of cankers on water deficits and, 252
White oak
  enzymic defenses against disease in, 256
  oak wilt and, 105
White pine
  blister rust of dispersal of, 468-69
Williams, Paul, 14
Wilts
  Clavibacter michiganensis and, 178
Wisconsin Fast Plants Program, 14-15
Witchweed seed germination factor, 12
Wolf, Frederick A., 25
Woody plants
  Xylella strains and, 8

X

Xanthan gums, 11
Xanthomonas campestris, 205
  extracellular polysaccharide of, 11
    plant pathogenesis and, 183-87
  pathovars of
    cloned avirulence gene transfer between, 415
Xanthomonas campestris pv. *campestris*
  seed fields and, 447
Xanthomonas campestris pv. *citrumelo*, 184
Xanthomonas campestris pv. *malvacearum*, 184
Xanthomonas campestris pv. *oryzae*, 97
Xanthomonas campestris pv. *phaseoli*, 149
  polyethylene glycol and, 459
Xanthomonas campestris pv. *translucens*, 152
Xanthomonas campestris pv. *vesicatoria*
  multiplication in host plants, 158
  rifampin-resistant, 151
Xanthomonas campestris pv. *vignicola*
  seed disease and, 449
Xiphinema americanum, 225
  nepovirus transmission and, 233
Xiphinema californicum
  nepovirus transmission and, 233
  tomato ringspot virus transmission and, 232-33
Xiphinema diversicaudatum, 224-25
Xiphinema index, 223, 225
Xiphinema rivesi
  nepovirus transmission and, 233
  tomato ringspot virus transmission and, 232-33
X-ray diffraction
  tobacco mosaic virus and, 6
Xylella
  Pierce's disease and, 8

Y

Yield
  See Crop yield